Summary of IUC's White Mesa Disposal Cell Cover Proposal

Figure 2–39 illustrates details (materials and thicknesses) of a typical reclamation cover that IUC proposes to construct. This proposed cover differs somewhat from the cover previously described for the reference cell but is typical of other NRC-approved covers for private licenses.

Components of the final top cover from the top down would consist of erosion protection riprap, a frost barrier, a compacted clay radon barrier, and a platform fill layer directly over the tailings. The side slope cover would consist of random fill covered by riprap. On-site borrow is available for all material except the riprap. Quarries located north of Blanding, approximately 8 miles from the White Mesa Mill site, would be used as the riprap source. Placement of these layers would be similar to that previously described for the reference cell. The materials would be stockpiled near the cell, then emplaced and compacted using standard construction equipment and techniques.

2.2.6 Monitoring and Maintenance

After completion of tailings placement and site reclamation, monitoring and maintenance of an off-site disposal cell at any of the three proposed locations would be in accordance with the Long-Term Surveillance and Maintenance Plan approved by NRC. Drainage areas and other areas susceptible to erosion would be inspected and repaired as needed.

Monitoring and maintenance procedures for the reference off-site disposal cell and the White Mesa Mill off-site disposal cell would be similar but not identical. An example of how monitoring and maintenance at the White Mesa Mill disposal cell would differ from the reference cell would be the need to manage storm water and internal infiltration drainage from upslope disposal cells at the White Mesa Mill site. There are no preexisting upslope cells with the reference cell design. Another example would be the need to operate and monitor the liner, drains, and leak detection system that would ostensibly be left in place in cell 4B at the White Mesa Mill site. This type of drainage system would not be used with the reference cell design.

2.2.7 Resource Requirements

This section describe DOE's estimate of the major resource requirements for the off-site disposal alternative.

2.2.7.1 Labor

Table 2–16 through Table 2–18 show the estimated average annual labor requirements. In all cases, the labor category "Site Support" represents construction oversight personnel employed by the Technical Assistance Contractor for DOE.

Off-site disposal would require construction labor to be performed at the Moab site, vicinity properties, borrow areas, and the selected disposal cell site. It would also require transportation-related labor. DOE's estimates of the average annual labor requirements for construction-related activities for the Moab site, vicinity properties, borrow areas, and the selected disposal cell would be the same for all three modes of transportation. In general, single numbers in Table 2–16 through Table 2–18 indicate the labor for a single 12-hour shift working 7 days a week, 350 days a year. A double-shift schedule would require 67 to 100 percent more total work force to accomplish the same work. Where dual numbers are shown in the tables, they indicate the labor required for a single 12-hour shift (lower number) versus a double 10-hour shift schedule.

Table 2–16. Average Annual Labor Requirements—Truck Transportation

Labor Category	Construction Labor				Transportation Labor		
	Moab Site	Vicinity Properties	Borrow Areas	Disposal Cell	Klondike Flats	Crescent Junction	White Mesa Mill
Equipment Operators	25	6	7	28	–	–	–
Site Support	19	4	3	16	9–18	9–18	10–20
Truck Drivers	1	3	2–10	8	34–61	50–87	109–192
General Labor	22	10	10	18	–	–	–
Mechanics	–	–	–	–	3–5	4–7	8–17
Total Average Workforce	**67**	**23**	**22–30**	**70**	**46–84**	**63–112**	**127–229**

Table 2–17. Average Annual Labor Requirements—Rail Transportation

Labor Category	Construction Labor				Transportation Labor	
	Moab Site	Vicinity Properties	Borrow Areas	Disposal Cell	Klondike Flats	Crescent Junction
Equipment Operators	25	6	7	28	–	–
Site Support	19	4	3	16	–	–
Truck Drivers	1	3	2–10	8	3–6	3–6
General Labor	22	10	10	18	–	–
Conveyor Operators/Crew	–	–	–	–	6–10	6–10
Train Engineer	–	–	–	–	9–14	17–28
Train Maint. Crew	–	–	–	–	1	1
Total Average Workforce	**67**	**23**	**22–30**	**70**	**19–31**	**27–45**

Table 2–18. Average Annual Labor Requirements—Slurry Pipeline Transportation

Labor Category	Construction Labor				Transportation Labor		
	Moab Site	Vicinity Properties	Borrow Areas	Disposal Cell	Klondike Flats	Crescent Junction	White Mesa Mill
Equipment Operators	25	6	7	28	–	–	–
Site Support	19	4	3	16	4	4	4
Truck Drivers	1	3	2–10	8	3–6	3–6	3–6
General Labor	22	10	10	18	–	–	–
System Operators	–	–	–	–	21	21	25
Pipeline Construction	–	–	–		250	330	502
	–	–	–	–	–	–	–
Total Average Workforce	**67**	**23**	**22–30**	**70**	**28–31[a]**	**28–31[a]**	**32–35[a]**

[a] Excludes pipeline construction labor. The duration of pipeline labor would be 9 months for White Mesa Mill, 7 months for Crescent Junction, and 6 months for Klondike Flats, and its labor requirements are not included in annual averages.

2.2.7.2 Equipment

Table 2–19 through Table 2–21 represent average annual equipment requirements for the off-site disposal alternative. Off-site disposal would require construction equipment at the Moab site, vicinity properties, borrow areas, and the selected disposal site. It would also require transportation-related equipment. (For the pipeline option, transportation-related equipment is considered to include pipeline construction equipment.) DOE’s estimates of the average annual equipment requirements for construction-related activities for the Moab site, vicinity properties, borrow areas, and the selected disposal cell are the same for all three modes of transportation.

Table 2–21. Average Annual Equipment Requirements—Slurry Pipeline Transportation Mode

Equipment Type	Construction Equipment				Transportation Equipment		
	Moab Site	Vicinity Properties	Borrow Areas	Disposal Cell	Klondike Flats	Crescent Junction	White Mesa Mill
Tractor	2	–	–	1	–	–	–
Backhoe	1	1	1	2			
Grader	1	–	1	2	1	1	2
Trackhoe	1	–	–	1	2	4	10
Front-end loader	2	1	1	2	1	2	4
End dump truck	–	1	–	1	1	2	4
Water truck	1	1	1	2	1	1	1
Crane	1	–	–	–			
21 yd^3 scrapers	3	–	1	6			
Dozer	3	–	1	2	8	7	18
Sheepfoot compactor	1	–	–	2	–	–	–
Pickup truck	4	2	1	4	17	18	27
Welding rig	1	–	–	–			
Skidsteer	–	2	–	1			
16 yd^3 drag line	2	–	–	–	–	–	–
Tandum trucks	–	–	1–7 (per shift)	3	–	–	–
Tandum trucks (debris haul)	–	–	–	–	2–5	2–5	2–5
Flatbed truck	–	–	–	–	1	2	5
Crane	–	–	–	–	1	1	1
Side boom crane	–	–	–	–	2	3	8
Trencher	–	–	–	–	1	1	2
Total	**23**	**8**	**8–14**	**29**	**38–41**	**44–47**	**84–87**

2.2.7.3 Land Disturbance

Table 2–22 summarizes DOE's estimates of the acres of land that would be disturbed under the off-site disposal alternatives. These disturbances include those that would result from remediation of the Moab site and vicinity properties, disposal cell construction at off-site locations, construction of transportation infrastructures, and excavation of borrow material. Estimates of required volumes of borrow material are shown in Table 2–7. The final area of land disturbed at borrow areas would vary depending on the final selection of borrow areas (see Table 2–6) and the depth to which borrow soils could be extracted. The values shown for disturbances to borrow areas in Table 2–22 represent DOE's estimate of the maximum disturbance.

2.2.7.4 Fuel

Table 2–23 summarizes DOE's estimates of the fuel consumption for the three off-site disposal alternatives and modes of transportation.

2.2.7.5 Water

The discussion of potable and nonpotable water uses in Section 2.1.5.5 also applies to the off-site disposal alternative. Table 2–24 shows the estimated nonpotable water consumption for the three transportation modes for all three off-site disposal locations. It is assumed that DOE's Colorado River water rights would supply nonpotable water for the Klondike Flats and Crescent Junction off-site disposal alternatives and part of the White Mesa Mill site needs. The remainder of nonpotable water needed for the White Mesa Mill site would be supplied from water rights to Recapture Reservoir or deep wells at the millsite. Rail and truck transportation options show a range of usage based on one 12-hour shift or two 10-hour shifts. To the extent that Colorado River water use exceeds USF&WS protective limits, DOE would mitigate the unavoidable adverse impact with negotiated water depletion payments.

Table 2–22. Estimated Maximum Acres of Disturbed Land for the Off-Site Disposal Alternatives

Location/Activity	Alternative							
	Klondike Flats			Crescent Junction			White Mesa Mill	
	Truck	Rail	Slurry	Truck	Rail	Slurry	Truck	Slurry
Moab Site	439	439	439	439	439	439	439	439
Vicinity Properties[a]	6	6	6	6	6	6	6	6
Borrow Areas								
Cover soils	400	400	400	400	400	400	0[b]	0[b]
Moab reclamation soils	152	152	152	152	152	152	152	152
Radon barrier soil	138	138	138	138	138	138	12	12
Other	NA	NA	NA	NA	NA	NA	10[c]	10[c]
Pipeline Construction[d]	NA	NA	85	NA	NA	164	NA	430
Disposal Cell Area								
Cell Construction Area[e]	435	420	435	435	420	435	346	346
Overpass/ Haul or Access Roads for Truck Transport	40	NA	24	13	NA	11	2	NA
Rail Infrastructure[f]	NA	69	NA	NA	57	NA	NA	NA
Total	**1,610**	**1,624**	**1,679**	**1,583**	**1,612**	**1,745**	**967**	**1,395**

[a]Assumes average disturbances of 2,500 ft^2 to 98 properties.
[b]Excavated material would be used as cover soil.
[c]Blanding riprap.
[d]Assumes disturbance to a 40-foot right-of-way.
[e]New cell footprint and adjacent construction and support areas.
[f]New rail spurs, truck/train transfer station, and haul road to cell.

Table 2–23. Estimated Annual Fuel Consumption for the Off-Site Disposal Alternatives (thousands of gallons)

Alternative							
Klondike Flats			Crescent Junction			White Mesa Mill	
Truck[a]	Rail[a]	Slurry[b]	Truck[a]	Rail[a]	Slurry[b]	Truck[a]	Slurry[b]
2,336–4,314	2,053–3,232	1,798	2,712–4,873	2,187–3,657	1,798	4,032–6,827	1,469

[a]Two figures indicate annual averages for one 12-hour shift (lower value) and two 10-hour shifts (higher value).
[b]For the slurry pipeline alternative, despite its longer pipeline length, the White Mesa Mill fuel consumption is less than that for Klondike Flats or Crescent Junction because of significantly lower distances for hauling borrow materials at White Mesa Mill. Similarly, Klondike Flats and Crescent Junction consumptions are the same for the slurry pipeline alternative because differences in borrow material haul distances offset the differences in pipeline length for these two alternatives.

Table 2–24. Estimated Annual Nonpotable Water Consumption

Transportation Option	Total Project Water Consumption (acre-feet)	Average Annual Water Consumption (acre-feet)
Rail	635–710	130–235
Truck	700–775	135–240
Slurry Pipeline	3,470	730

Table 2–25 shows the estimated potable water consumption for the three transportation modes for all three off-site disposal location locations. Consumption rates are based on the 12-hour shift and use an average of the labor required for the different transportation options. If the double 10-hour shift were selected, consumption rates would increase by 67 percent but would apply for the shorter construction duration.

Table 2–25. Potable Water Consumption Rates

Transportation Option	Average Daily Water Consumption Rate (gallons)
Rail	7,500
Truck	9,000
Slurry Pipeline	6,600

2.2.7.6 Solid Waste Disposal

Approximately 2,080 yd^3 of solid waste per year would be generated at the combined Moab and Klondike Flats, Crescent Junction, or White Mesa Mill sites for the off-site disposal alternatives. The solid waste from the Moab, Klondike Flats, or Crescent Junction sites would be disposed of in the Grand County landfill. The solid waste from the White Mesa Mill site would be disposed of in tailings cells that currently exist at the site or in the new tailings disposal cell constructed for Moab site contaminated materials.

2.2.7.7 Sanitary Waste Disposal

Table 2–26 shows the estimated maximum weekly sanitary waste generation for the three transportation modes for all three off-site disposal locations. The estimated volumes are based on the 12-hour shift and use an average of the labor required for the different transportation options. If the double 10-hour shift were selected, the volume generated weekly would increase by 67 percent but would apply for the shorter construction duration. Septic holding tanks would be placed at both the Moab site and the off-site disposal location; some portable toilets would be used to provide sanitary waste service. Both the septic tanks and the portable toilets would be pumped out routinely, and the waste would be disposed of at the city of Moab sewage treatment plant for the Klondike Flats or Crescent Junction off-site disposal alternatives or at the city of Blanding sewage treatment plant for the White Mesa Mill off-site disposal alternative. White Mesa Mill also has an on-site State-approved leach field system that has adequately managed sanitary waste generated by up to 140 workers during past operations.

Table 2–26. Sanitary Waste Generated

Disposal Option	Maximum Weekly Generation (gallons)
Rail	15,000
Truck	21,000
Slurry Pipeline	15,400

2.2.7.8 Electric Power

Table 2–27 shows DOE's estimate of the power demands at the Moab site and at the three potential off-site disposal locations for the three transportation modes. In general, the major demands would be:

- Field office trailers.
- Office and parking lot security lighting.
- River pump station (at Moab).
- Decontamination water sprays and recycle pumps.
- Train transfer station (rail transportation).
- Pipeline slurry system (pipeline transportation).

Table 2–27. Estimated Maximum Average Annual Electric Power Demand (kVA) For the Off-Site Disposal Alternative

Transportation Mode	Location			
	Moab Site	Klondike Flats Site	Crescent Junction Site	White Mesa Mill Site
Truck	600	300	300	300
Rail	700	600	600	–
Pipeline	–	2,500 (terminal)	2,800 (terminal)	3,100 (terminal)
To Klondike Flats	3,400			4,800 (booster)
To Crescent Junction	4,800			
To White Mesa Mill	6,100			

2.3 Ground Water at the Moab Site

Section 2.3.1 provides background on the ground water standards, contaminants of concern, and the compliance strategy selection process. This includes remediation goals for the ground water, and the relationship with existing interim actions. Section 2.3.2 discusses the proposed ground water remediation, including remediation options and time frames, and the predicted contaminant concentrations as a result of active remediation. It also discusses the predicted outcome of the ground water No Action alternative. Section 2.3.3 discusses ground water remediation uncertainties.

2.3.1 Background

The uppermost aquifer at the Moab site occurs in unconsolidated Quaternary alluvial material deposited on older bedrock units in the basin that forms Moab Valley. Although the quality of this aquifer has been adversely affected by uranium processing activities at the site, it does not represent a potential source of drinking water. However, discharge of contaminated ground water from this aquifer has resulted in elevated concentrations of ammonia and other site-related constituents in the Colorado River. While the contaminants do not pose unacceptable risk to humans, they do exceed levels considered to be protective of aquatic life. Therefore, the objective of the proposed ground water action is to protect the environment, particularly endangered species of fish that are known to use that portion of the river.